# FACT SHEET NARRATIVE

**Lafarge Building Materials, Inc.**
**Permit No.: NY 000 5037**

**Water Quality Engineer: Aslam Mirza**
**Permit Writer: Sudhir Mahatma**
**Date: September 17, 2012**

## NEED FOR PERMIT MODIFICATION

This permit was recently renewed and modified on August 30, 2010 (effective date October 1, 2010) under the New York State Department of Environmental Conservation Division of Water's *Environmental Benefit Permit Strategy*. This permit renewal updated requirements and action levels for Whole Effluent Toxicity (WET) testing, updated outfall information and monitoring requirements for storm water discharges, incorporated a new schedule of compliance for addressing biological requirements (particularly for evaluating Best Technology Available or "BTA" for the cooling water intake), added new schedules of compliance for evaluating the existing quench water system and completion of storm water best management practices (BMPs), added a new schedule of compliance for investigating cement kiln dust (CKD) landfill leachate for potential future treatment, and added new requirements for developing a Mercury Minimization Plan (MMP).

This permit is being modified again at the request of the permittee to reflect planned changes in operations and resulting discharges, referred to as the "Ravena Plant Modernization" or "RPM." The initial modification request was received 8/11/2010 and follow-up information and requests were received 9/8/2010 and 9/21/2010.

## ADDITIONAL PERMIT MODIFICATIONS (Ren2/Mod3 and Ren2/Mod4)

*Ren2/Mod3:* This permit was modified at the request of the applicant to extend the date of initiation of the Impingement Mortality and Entrainment Characterization (IM/EC) Study which is required in the permit. Lafarge is currently conducting a 0.5 mm Wedgewire Feasibility Study, and the information gathered from that study will enhance decision-making regarding the feasibility and effectiveness of installing and operating wedge wire screens and in determining future modifications to the cooling water intake structure. The modification accounts for further data gathering from the Feasibility Study and an extension of the initiation of the IM/EC Study. No further modifications to the permit were authorized under the Ren2/Mod3 modification.

*Ren2/Mod4:* The permit is proposed to be modified at the request of the applicant to change the effective date for the final effluent thermal limits at Outfall 003 and the final effluent limits at Outfall 023 from October 1, 2012 to December 31, 2013.

The change to the effective date for the final effluent thermal limits at Outfall 003 will not significantly

impact the water quality in Coeymans Creek. The thermal limits described in the monitoring requirements are currently sufficiently protective of the biota within Coeymans Creek, and during the extended interim time period, these limits remain. In modifying the dates, the facility will be accelerating the date when the Outfall 003 discharge authorization and monitoring requirements will terminate, based on the elimination of the outfall and its associated water quality and thermal impacts. The change to the effective date for the final effluent limits at Outfall 023 will not significantly impact the water quality of Coeymans Creek. Outfall 023 does not currently discharge to surface water, and the effluent limits described in the monitoring requirements are currently sufficiently protective of the biota within Coeymans Creek. The operation of the facility in accordance with the permit conditions will continue to meet all regulatory standards.

## DESCRIPTION OF OPERATIONS

Lafarge currently uses a "wet" process for manufacturing Portland Cement. The company obtains the lime needed for the manufacturing process from an onsite limestone quarry, in accordance with a *Mined Land Reclamation* permit issued by the Department. Following quarrying of the limestone, it is ground and blended with other raw materials such as clay, sand, bauxite, iron, and water, to produce a slurry. The operation then uses a rotary kiln to heat the slurry to approximately 2650 degrees F, where chemical reactions produce "clinker." The clinker is then ground to a powder consistency and blended with certain amounts of gypsum to produce Portland Cement, a component of concrete. The final product is then shipped offsite via ship, rail, or trucks, mostly in bulk form but also in bagged form. Current production of clinker is approximately 1.72 million short tons per year.

However, as part of the RPM, Lafarge is re-designing and constructing an entirely new operation to convert to a "dry" manufacturing process. Changes from current operations for modernizing the process include removal of the two existing wet kilns and replacing these with a dry kiln, installation of a new Flue Gas Desulfurization Unit (FGD Unit) with a wet scrubber, and installation of a new Cogen Plant for generating 6 megawatts of energy for onsite use. The Cogen Unit will utilize a cooling tower from which all blowdown and demineralization plant wastewater will be returned to the process, resulting in complete recycling of all aqueous waste streams and the elimination of all industrial wastewater and cooling water discharges to surface waters.

As part of the RPM, existing Outfall 003 will be eliminated as a monitoring location and tributary wastewaters will be assigned individual outfall designations. This will effectively restore the status of Unnamed Tributary 1 of Coeymans Creek. Some other outfalls will be either eliminated or re-numbered, as described under **Section 5 – Summary of Proposed Permit Changes** at the end of this fact sheet.

## APPLICABLE REGULATIONS

The Standard Industrial Code (SIC) which is applicable to the Lafarge process operation is 3241 –

*Cement, Hydraulic*. Lafarge's current treated process wastewater discharge at Outfall 003 is not categorically regulated at the federal level in accordance with 40 CFR 411 – CEMENT MANUFACTURING POINT SOURCE CATEGORY. The only industrial process which these categorical limits would apply to is the slurry tank makeup. But makeup water is currently evaporated in the kiln and is not discharged to any waters of the State. Consequently, current discharge limits are based on specific water quality considerations and Best Professional Judgement (BPJ).

Under the RPM, the slurry tank and required makeup water would be eliminated and cooling tower blowdown generated by the new operation will be recycled and not discharged. Therefore, 40 CFR 411 – CEMENT MANUFACTURING POINT SOURCE CATEGORY effluent guidelines would again not apply. Because there would be no discharge of wastewater subject to effluent guidelines under the RPM, limits for this RPM SPDES permit modification are based on specific water quality considerations and Best Professional Judgement (BPJ).

**OUTFALL ADDITIONS, DELETIONS, AND RECONFIGURATIONS**

Numerous changes are proposed for the existing outfalls at the Lafarge site under the RPM. Outfall 003 currently is a monitoring location within Unnamed Tributary 1 of Coeyman's Creek. Outfall 003 is being proposed for deletion from the permit in favour of regulating individual discharges tributary to Unnamed Tributary No. 1 of Coeyman's Creek as outfalls.

Outfall 03A, the current internal discharge of onsite-treated sanitary wastewater to Outfall 003, is proposed to be re-numbered to Outfall 022 and re-configured as a distinct discharge to Unnamed Tributary 1 of Coeyman's Creek.

Outfall 03B, the current internal discharge of CKD landfill leachate to Outfall 003, is proposed to be re-numbered to Outfall 023 and re-configured as a distinct discharge to Unnamed Tributary 1 of Coeyman's Creek.

Outfall 03C, the overflow from the current settling pond to Coeymans Creek, is proposed to be deleted from the permit because the settling pond which is part of the current industrial wastewater treatment system (discharging via Outfall 003) is proposed to be eliminated as an outfall under the RPM.

Current Outfall 006 is being proposed for deletion from the permit because storm water which is currently discharged from this outfall (Aggregate Processing Plant Area) will be re-directed to a new Storm Water Detention Pond.

Outfall 010, which currently discharges both quarry pumpout water and storm water, will discharge only storm water from the Tunnel Basin, as quarry pumpout water will be directed to a newly-proposed Quarry Water Storage Tank for industrial use or discharge via outfall 020 to Unnamed Tributary 1 of

Coeymans Creek.

Outfall 020 is proposed to be added to the permit for the periodic discharge of excess quarry water (not used in the process) to Unnamed Tributary 1 of Coeyman's Creek.

Outfall 021 is proposed to be added to the permit for the discharge of storm water from the proposed Storm Water Detention Pond to Unnamed Tributary 1 of Coeyman's Creek. Storm water from this portion of the site is currently tributary to outfall 003.

Outfall 022 is proposed to be the new outfall designation by re-numbering current Outfall 03A (treated sanitary wastewater), and also re-configured from the current internal discharge (to Outfall 003) to a new, distinct discharge to Unnamed Tributary 1 of Coeyman's Creek.

Outfall 023 is proposed to be the new outfall designation by re-numbering current Outfall 03B (CKD landfill leachate), and also re-configured from the current internal discharge (to Outfall 003) to a new, distinct discharge to Unnamed Tributary 1 of Coeyman's Creek.

Outfall 024 is a newly-proposed outfall for the discharge of storm water from the cement manufacturing area to Unnamed Tributary 1 of Coeyman's Creek. Storm water from this portion of the site is currently tributary to outfall 003.

Outfall 025 is also a newly-proposed outfall for the discharge of storm water from the cement manufacturing area to Unnamed Tributary 1 of Coeyman's Creek. Storm water from this portion of the site is currently tributary to outfall 003.

## THERMAL AND BIOLOGICAL EVALUATIONS

The requirements for Lafarge to demonstrate that the facility's NCCW discharge at Outfall 003 meets the thermal criteria specified in 6 NYCRR Part 704 at paragraph 704.2(b)(2), have been deferred until October 1, 2012. If Lafarge does not follow through with the RPM, the company will still have to meet these requirements, and it would also be necessary for Lafarge to demonstrate that the facility's NCCW *intake* meet the requirements specified under §704.5- **Intake structures**.

A **Biological Fact Sheet** is also included with this SPDES Fact Sheet which describes Biological Requirements. These requirements are applicable regardless if Lafarge goes forward with the RMP and are described beginning on page 26.

## SCHEDULES OF COMPLIANCE

A new schedule of compliance is added to the modified SPDES permit to specify the deadlines for complying with the biological requirements described in the above paragraph.

**SPDES PERMIT FACT SHEET: Wastewater Data, Receiving Water Data, and Permit Limit Derivation.**

**(See last page of Fact Sheet for Explanatory Notes)**

| | |
|---|---|
| **Date** | November 18, 2010 |
| **Permit Writers** | Shayne Mitchell |
| **WQ Engineers** | Aslam Mirza |

## (1) General Permittee Data:

| Permit Number | Permittee Name | Facility Name | Location (C, T, V) | County | Industrial Code | Major/Sub Basin |
|---|---|---|---|---|---|---|
| NY 000 5037 | Lafarge Building Materials, Inc. | Lafarge Building Materials, Inc. | Coeymans (T) | Albany | 3241 (Cement, Hydraulic), 1422 (Crushed and Broken Limestone) | 13/01 |

## (2) Summary of Final Outfall Flow Rate(s) and Receiving Water Data:

| **Outfall Information** | | | | | **Receiving Water Information** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Outfall # | Latitude | Longitude | Flow Rate (MGD) | | | | | *For use by WQ Engineer* - Critical Data | | | | | |
| | ° , ‘ , “ | ° , ‘ , “ | Average | Design or Maximum | Name | Class | Water Index No. | 7Q10 (MGD) | 30Q10 (MGD) | Dilution/ Mixing | pH (SU) | Temp (°F) | Hardness (mg/l) |
| 001 | - | - | - | - | No longer active. Removed from permit. | - | - | - | - | - | - | - | - |
| 003 [1] | 42 29 20 | 73 49 20 | 1.8 | 6.5 Actual<br>68 Design | Coeymans Creek | C(TS) | H-214 | 1.0 | - | <1:1 | 7.5 | - | 100 |
| 03A | - | - | - | - | Outfall re-numbered to 022. | - | - | - | - | - | - | - | - |
| 03B | - | - | - | - | Outfall re-numbered to 023. | - | - | - | - | - | - | - | - |
| 03C [1] | 42 29 79 | 73 49 40 | Intermittent | NA | Settling Pond Overflow to Coeymans Cr. | C(TS) | H-214-1 | 1.0 | - | - | - | - | - |
| 004 | 42 28 73 | 73 49 73 | 0.0024 | NA | Unnamed Sub-Tributary to Hannacroix Cr. | D | H-212-2-Trib | Intermittent | - | - | - | - | - |
| 005 | 42 28 75 | 73 49 74 | 0.00006 | 0.00006 | Unnamed Sub-Tributary to Hannacroix Cr. | D | H-212-2-Trib | Intermittent | - | - | - | - | - |
| 006 [1] | 42 29 62 | 73 49 06 | Varies | 1.8 Actual, 8.0 Design | Unnamed Tributary 1 to Coeymans Cr. | C | H-214-1 | Intermittent | - | - | - | - | - |
| 007 | 42 30 30 | 73 48 54 | Varies | 2.8 Actual, 36 Design | Coeymans Creek | C(TS) | H-214 | 1.0 | - | <1.1 | 7.5 | - | 100 |
| 008 | 42 29 00 | 73 50 05 | NA | NA | Unnamed Sub-Tributary to Hannacroix Cr. | D | H-212-2-Trib | Intermittent | - | - | - | - | - |
| 009 | - | - | - | - | No longer active. Removed from permit. | - | - | - | - | - | - | - | - |

**1-** This outfall will no longer be operational or permitted following commencement of operations for the Ravena Plant Modernization (RPM) project.

| **Outfall Information** | | | | | **Receiving Water Information** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Outfall # | Latitude | Longitude | Flow Rate (MGD) | | | | | *For use by WQ Engineer* - Critical Data | | | | | |
| | °, ‘, “ | °, ‘, “ | Average | Design or Maximum | Name | Class | Water Index Number | 7Q10 (MGD) | 30Q10 (MGD) | Dilution/ Mixing | pH (SU) | Temp (°F) | Hardness (mg/l) |
| 010 | 42 29 28 | 73 49 26 | 2.6 | 5.2 Actual/ Design | Unnamed Tributary 1 to Coeymans Cr. | C | H-214-1 | Intermittent | - | - | - | - | - |
| 011 | 42 29 33 | 73 47 07 | NA | NA | Hudson River | C | H | 1940 | 2200 | - | 7.5 | - | 100 |
| 012 | 42 29 25 | 73 47 13 | NA | NA | Hudson River | C | H | 1940 | 2200 | - | 7.5 | - | 100 |
| 013 | 42 29 27 | 73 47 21 | NA | NA | Hudson River | C | H | 1940 | 2200 | - | 7.5 | - | 100 |
| 014 | 42 29 84 | 73 48 69 | NA | NA | Coeymans Creek | C(TS) | H-214 | 1.0 | - | - | 7.5 | - | 100 |
| 015 | 42 29 79 | 73 49 40 | NA | NA | Coeymans Creek | C(TS) | H-214 | 1.0 | - | - | 7.5 | - | 100 |
| 016 | 42 28 73 | 73 49 73 | NA | NA | Coeymans Creek | C(TS) | H-214 | 1.0 | - | - | 7.5 | - | 100 |
| 017 | 42 28 75 | 73 49 74 | NA | NA | Unnamed Constructed Tributary to Coeymans Creek | C | H-214-1-Trib | Intermittent | - | - | 7.5 | - | 100 |
| 018 | 42 29 62 | 73 49 06 | NA | NA | Unnamed Constructed Tributary to Coeymans Creek | C | H-214-1-Trib | Intermittent | - | - | 7.5 | - | 100 |
| 019 | 42 30 30 | 73 48 54 | NA | NA | Coeymans Creek | C(TS) | H-214 | 1.0 | - | - | 7.5 | - | 100 |
| 020 | 40 29 31 | 73 48 59 | NA | NA | Unnamed Tributary 1 to Coeymans Cr. | C | H-214-1 | Intermittent | - | - | - | - | - |
| 021 | 42 29 33 | 73 48 53 | NA | NA | Unnamed Tributary 1 to Coeymans Cr. | C | H-214-1 | Intermittent | - | - | - | - | - |
| 022 | 42 29 50 | 73 48 41 | 0.005 | 0.014 Actual<br>0.015 Design | Unnamed Tributary 1 to Coeymans Cr | NA | NA | - | - | - | - | - | - |
| 023 | 42 29 50 | 73 48 41 | 0.025 | NA | Unnamed Tributary 1 to Coeymans Cr | NA | NA | - | - | - | - | - | - |
| 024 | 42 29 35 | 73 48 47 | NA | NA | Unnamed Tributary 1 to Coeymans Cr. | C | H-214-1 | Intermittent | - | - | - | - | - |
| 025 | 42 29 45 | 73 48 38 | NA | NA | Unnamed Tributary 1 to Coeymans Cr. | C | H-214-1 | Intermittent | - | - | - | - | - |

## Descriptions of Storm and Quarry Water Outfall Nos. 010 – 021, 024,025

**Outfall 010** – Quarry water discharge to unnamed pond in Unnamed Tributary 1.
**Outfall 011** – Roadside runoff from the northern portions of the Hudson River waterfront, draining down and off the roadway northeast of the deactivated No. 6 fuel oil tanks.
**Outfall 012** – South drainage of the Hudson River waterfront draining just below the conveyor towers directly into the Hudson River.
**Outfall 013** – Sheet drainage from the Gypsum piles draining into a channel west of the material piles at the Hudson River waterfront.
**Outfall 014** – Roadside drainage from the east flowing into a culvert north of the bridge at crossing where the conveyor belt road and bridge intersect with the Coeyman's Creek and NYS Thruway overpass.
**Outfall 015** – Same general location as Outfall 014 but further west. Roadside flow where spur road crosses underneath conveyor belt. Accounts for storm water drainage from the west on the north side of the conveyor road.
**Outfall 016** - Same general location as Outfall 014 but further west. Drainage from this outfall consolidates into a pair of culverts near a bridge, discharging into Coeyman's Creek. Accounts for drainage from the west on the south side of the conveyor road.
**Outfall 017** – South of the main plant, along main road. Near bone-yard where the road crosses over the unnamed constructed tributary which was created as part of the stream restoration project (Consent Order No. R-2004-0511, May 27, 2004) to divert site storm water away from Coeymans Creek. Accounts for runoff draining to the constructed tributary from the south.
**Outfall 018** – Same general location as Outfall 017, but accounts for runoff draining into the unnamed constructed tributary from the north.
**Outfall 019** – Same general location as Outfall 014.
**Outfall 020** – Excess quarry water to unnamed pond in Unnamed Tributary 1.
**Outfall 021** – Storm water from cement manufacturing area.
**Outfall 024** – Storm water from cement manufacturing area.
**Outfall 025** – Storm water from cement manufacturing area.

## (3) Individual Outfall Data Summaries and Permit Limit Development:

| **Outfall** | 001 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Quarry Pumout Water to Mosher Brook |
| Existing Wastewater Treatment Facilities | NA |
| EPA Point Source Category & Production Rate | NA |

This operation and its discharge no longer exist. The outfall is removed from the permit.

| **Outfall** | 003 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Non-contact cooling water (NCCW), storm water, ground water, sanitary wastewater, CKD leachate, quarry pump-out water, dust control water, truck wash water |
| Existing Wastewater Treatment Facilities | Settling Pond, pH adjustment, Chlorination. All treated wastewater is recycled for NCCW and slurry makeup (process). Slurry makeup water is evaporated in kilns. There are no wastewater discharges from the slurry tanks. |
| EPA Point Source Category & Production Rate | Not applicable. |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| WET TESTING | | | | | R - WQ | | | | | Recommended? | | YES[1] | | WQ | - |
| Flow Rate (MGD) - Prior to Recycle | Average 6.2 | | Maximum 9.4 | | Mon/Mon | | MA/DM | - | R - BPJ | - | Mon OK | - | - | T | - |
| Flow Rate (MGD)- Discharge to Creek | Average 1.8 | | Maximum 6.5 | | Mon/Mon | | MA/DM | - | R - BPJ | - | Mon OK | - | - | T | - |
| pH (su) | Minimum 4.8 | | Maximum 9.6 | | 6.0 - 9.0 | | Range | | R - BPJ | 6.5 – 8.5 | Tech Range OK | - | - | T | - |
| Solids, Total Suspended (mg/l) | 19/28 | | 680/1200 | | 25/30 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Total Dissolved (mg/l) | - | - | - | - | Mon/Mon | - | MA/DM | - | R - BPJ | 500 | Mon OK | - | - | T | - |
| Oil & Grease (mg/l) | 1.0/15 | 1.0/3.8 | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Chlorine, Total Residual | 0.02/0.13 | 0.04/0.13 | - | - | Mon/0.1 | - | MA/DM | - | R - WQ | 0.005 | 0.1 (Detection) | - | - | WQ | - |
| Mercury, Total (ng/l – EPA Method 1631) | 28[2]/- | - | - | - | Mon/50 | - | MA/DM | - | R - WQ | 0.7 ng/l | Note 1 | - | - | T | - |

**1 -** Apply TOGS 1.3.2 – Whole Effluent Toxicity Testing

**2 -** Special monitoring during RFI completion for the previous EBPS permit modification yielded this one-time result.

| **Outfall** | 003 (Continued) |
|---|---|

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Temperature | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Temp. | Mass | Type | Conc. | Basis | Conc. | Conc. | Mass | Type | | |
| Temperature (Effluent, Deg F) | 82.8/95.8 | 94.1/99.3 | - | - | Mon | - | DM[1] | - | R – WQ | - | - | - | - | - | - |
| Temperature (Effluent, Deg F) | - | - | - | - | 70 | - | DM | - | 704.2(b)(2)(i), R | ≤ 70° F | ≤ 70° F | - | - | WQ | 2 |
| Temperature, Upstream (U)[3] | 74/80.4 | 81.2/84.4 | - | - | Mon | - | DM | - | R – WQ | ≤ 70° F | ≤ 70° F | - | - | T | 3 |
| Temperature, Downstream (D)[3] | 77/87 | 82.4/85.8 | - | - | Mon | - | DM | - | R – WQ | - | - | - | - | T | 3 |
| Temperature Differential (ΔT = D - U)[3] (June – Sept.) | 3.4/4.5 | 4.6/5.4 | - | - | 4.0 | - | DM | - | R – WQ | - | - | - | - | T | 3 |
| Temperature Differential (ΔT = D - U)[3] (June – Sept.) | 3.4/4.5 | 4.6/5.4 | - | - | ± 2.0 | - | DM | - | 704.2(b)(2)(ii), R<br>704.2(b)(2)(iv), R | ΔT ≤ +2° F<br>ΔT ≤ -2° F | - | - | - | WQ<br>WQ | 2,3<br>2,3 |
| Temperature Differential (ΔT = D - U)[3] (Oct. – May) | - | - | - | - | Mon | - | DM | - | 704.2(b)(2)(iii), R | - | - | - | - | T | 3 |
| Temperature Differential (ΔT = D - U)[3] (Oct. – May) | - | - | - | - | 5.0 | - | DM | - | 704.2(b)(2)(iii), R | ΔT ≤ 5° F | - | - | - | WQ | 2,3 |
| Temperature Differential (ΔT = Discharge - U)[3] | 13.6/21.7 | 18.0/20.8 | - | - | Mon | - | DM | - | R - WQ | - | - | - | - | T | 3 |
| WET – Acute Invertebrate | - | - | - | - | 0.3 | - | AL | - | TOGS 1.3.2, R | None | 0.3 | - | AL | WQ | - |
| WET - Acute Vertebrate | - | - | - | - | 0.3 | - | AL | - | TOGS 1.3.2, R | None | 0.3 | - | AL | WQ | - |
| WET – Chronic Invertebrate | - | - | - | - | 1.6 | - | AL | - | TOGS 1.3.2, R | None | 1.6 | - | AL | WQ | - |
| WET – Chronic Vertebrate | - | - | - | - | 1.6 | - | AL | - | TOGS 1.3.2, R | None | 1.6 | - | AL | WQ | - |

**Footnotes**

1 – "DM" = "Instantaneous Maximum"

2 - Apply thermal criteria found at 6 NYCRR 704.2(b)(2)

3 – "U" = Upstream Temperature – Deg. F, "D" = Downstream Temperature – Deg. F

| **Outfall** | 03A |
|---|---|
| Source(s) of Wastewater | Treated sanitary wastewater - discharged to Outfall 003 |
| Existing Wastewater Treatment Facilities | Two 10,000 gal. septic tanks followed by two 10-foot diameter Bioclere trickling filter units, sodium hypochlorite disinfection |
| EPA Point Source Category & Production Rate | NA |

This outfall number has been re-numbered as Outfall 022.

| **Outfall** | 03B |
|---|---|
| Source(s) of Wastewater | CKD Landfill Leachate |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

This outfall number has been re-numbered as Outfall 023.

| **Outfall** | 03C [1] |
|---|---|
| Source(s) of Wastewater | Settling Pond Overflow |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. | Conc. | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = GPD | Ave: No Data | | Max: No Data | | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum No Data | | Maximum No Data | | 6.0 – 9.0 | | Range | | R - BPJ | 6.5 – 8.5 | Tech OK | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | 25/30 | - | MA/DM | - | R - BPJ | Narrative - 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative - 703.2 | Tech OK | - | - | T | - |

1 – This outfall will terminate discharges and deleted from the permit upon commencement of the Modernization operations.

| **Outfall** | 004 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Quarry garage sewage sand filter discharge. **Discharge is INACTIVE at the time of permit modification. Permittee requests to keep in permit.** |
| Existing Wastewater Treatment Facilities | Sand filtration (leachfield), discharge to unnamed sub-tributary to Hannacroix Creek. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = GPD | Ave: None (Inactive) | | Max: None (Inactive) | | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | 1 |
| pH (su) | Minimum No Data | | Maximum No Data | | 6.0 – 9.0 | | Range | | R - BPJ | 6.0 – 9.5 | Tech OK | - | - | T | 1 |
| $BOD_5$ (mg/l) | - | - | - | - | Mon/5.0 | - | DM | - | R – WQ | D.O. – 703.3 | 5.0 | - | - | WQ | 1 |
| Ammonia, as $NH_3$ (mg/l) | - | - | - | - | 2.0 | - | DM | - | R – WQ | 1.5/2.2 | 2.0 | - | - | WQ | 1 |
| Dissolved Oxygen (mg/l) | - | - | - | - | Mon/7.0 | - | D **Minimum** | - | R – WQ | D.O. – 703.3 | 7.0 | - | - | WQ | 1 |
| Solids, Total Suspended (mg/l) | - | - | - | - | 10 | - | DM | - | R – WQ | Narrative 703.2 | 10.0 | - | - | WQ | 1 |
| Solids, Settleable (ml/l) | - | - | - | - | 0.1 | - | DM | - | R – WQ | Narrative 703.2 | 0.1 ml/l | - | - | WQ | 1 |

1 - Intermittent stream effluent limits (ISEL) applied to Outfall 004.

| **Outfall** | 005 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Quarry garage oil/water separator discharge (from floor drains). **There has been no discharge for more than 3 years from the time of permit modification.** |
| Existing Wastewater Treatment Facilities | Oil/Water separator, discharge to unnamed sub-tributary to Hannacroix Creek. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Av/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. | Conc. | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = GPD | Average: | None | Maximum: | None | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum: | No Discharge | Maximum: | No Discharge | 6.0 – 9.0 | | Range | | R - BPJ | 6.0 – 9.5 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | No data | No data | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative – 703.2 | Tech OK | - | - | T | - |

.

| **Outfall** | 006 [1] |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Aggregate areas storm water runoff (Lafarge land leased to Callanan Industries), and ground water. |
| Existing Wastewater Treatment Facilities | None |
| EPA Point Source Category & Production Rate | 40 CFR Part 411, Subpart C – Materials Storage Piles Runoff Subcategory (Aggregate – Callanan Industries) |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = MGD | Average: 0.25 | | Maximum: 1.8 | | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum: 7.3 | | Maximum 8.0 | | 6.0 – 9.0 | | Range | | R - BPJ | 6.0 – 9.5 | Tech OK | - | - | T | - |
| Solids, Total Suspended (mg/l) | 23/57 | 62/100 | - | - | Mon/45 | - | MA/DM | - | R - BPJ | Narrative – 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative – 703.2 | Tech OK | - | - | T | - |
| Solids, Total Dissolved (mg/l) | 1220 | - | - | - | Mon/Mon | - | MA/DM | - | R - BPJ | 500 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | 1.0/1.1 | 1.1/1.1 | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative – 703.2 | Tech OK | - | - | T | - |

1 – This outfall will be eliminated upon commencement of the Modernization operations.

| **Outfall** | 007 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Storm water runoff from former clay mining area and CKD management. |
| Existing Wastewater Treatment Facilities | None |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = MGD | Average: 0.99 | | Maximum: 2.8 | | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum: 7.8 | | Maximum: 10 | | 6.0 – 9.0 | | Range | | R - BPJ | 6.5 – 8.5 | Tech OK | - | - | T | - |
| Solids, Total Suspended (mg/l) | 13/22 | 27/37 | - | - | 25/45 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | <0.1 | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Total Dissolved (mg/l) | 2940 | - | - | - | Mon/Mon | - | MA/DM | - | R - BPJ | 500 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | 1.1/1.6 | 1.5/1.7 | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |

| **Outfall** | 008 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Becraft Pond dewatering. **Inactive at time of permit modification. Permittee requests to keep in permit.** |
| Existing Wastewater Treatment Facilities | None. Discharge to unnamed sub-tributary to Hannacroix Creek. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = GPD | Average: | No data | Maximum: | No data | Mon/Mon | - | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (SU) | - | - | - | - | 6.0 – 9.0 | - | Range | - | R - BPJ | 6.0 – 9.5 | - | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | 25/45 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (mg/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |

| **Outfall** | 009 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Primary Rock Crusher Air Scrubber Blowdown |
| Existing Wastewater Treatment Facilities | NA |
| EPA Point Source Category & Production Rate | NA |

This operation and its discharge no longer exist and has been removed from the permit.

| **Outfall** | 010 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Pre-modernization: Quarry pump out water and storm water that collects in quarry. Post-modernization: Storm water. |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. | Conc. | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = MGD | Average: 2.6 | | Maximum: 5.2 | | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum: No data | | Maximum: No data | | 6.0 – 9.0 | | Range | | R - BPJ | 6.5 – 8.5 | Tech OK | | | | |
| Solids, Total Suspended (mg/l) | - | - | - | - | 25/45 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | - | - | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |

| **Outfall** | 011, 012, 013* |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Storm Water - See **Description of Storm Water Outfalls** on Page 8 |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | 40 CFR 411, Subpart C – Materials Storage Piles Runoff Subcategory (Gypsum) |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| pH (su) | Minimum - | | Maximum - | | 6.0 – 9.0 | | Range | | 40 CFR 411.32, R | 6.5 – 8.5 | Tech OK | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | Mon/50 | - | MA/DM | - | 40 CFR 411.32, R | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | - | - | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Sulfate, Total (mg/l) | - | - | - | - | Mon/Mon | - | MA/DM | - | R - BPJ | - | Mon. OK | - | - | T | - |
| Sulfite, Total (mg/l) | - | - | - | - | Mon/Mon | - | MA/DM | - | R - BPJ | 0.2 | Mon. OK | - | - | T | - |

* Numbered as “Outfall 101,” “Outfall 102,” and “Outfall 103” respectively, in May 4, 2009 Lafarge submittal of updated NY-2C.

| **Outfalls** | 014 thru 019 * |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Storm Water - See **Description of Storm Water Outfalls** on Page 8 |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| pH (su) | Minimum - | | Maximum - | | 6.0 – 9.0 | | Range | | R - BPJ | 6.5 – 8.5 | Tech OK | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | Mon/50 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | - | - | - | - | Mon/15 | - | MA/DM | - | R - BPJ | Narrative 703.2 | Tech OK | - | - | T | - |

* Numbered as “Outfall 104” thru “Outfall 109” respectively, in May 4, 2009 Lafarge submittal of updated NY-2C.

| **Outfalls** | 020 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Excess Quarry Water . |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Avg/Max | 95%/99% | Avg/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| pH (su) | Minimum - | | Maximum - | | 6.0 – 9.0 | | Range | | * | 6.5 – 8.5 | 6.5-8.5 | - | - | WQ | - |
| Flow | - | - | - | - | Mon/Mon | - | MA/DM | - | BPJ | - | - | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | 25/45 | - | MA/DM | - | * | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | * | Narrative 703.2 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | - | - | - | - | Mon/15 | - | MA/DM | - | * | Narrative 703.2 | Tech OK | - | - | T | - |

* - 1999 DEC Stone, Sand & Gravel guidance.

| **Outfalls** | 021, 024, 025 |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Storm Water - See **Description of Storm Water Outfalls** on Page 8 |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Avg/Max | 95%/99% | Avg/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| pH (su) | Minimum - | | Maximum - | | 6.0 – 9.0 | | Range | | * | 6.5 – 8.5 | Tech OK | - | - | T | - |
| Flow | - | - | - | - | Mon/Mon | - | MA/DM | - | BPJ | - | - | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | 25/45 | - | MA/DM | - | * | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.1 | - | MA/DM | - | * | Narrative 703.2 | Tech OK | - | - | T | - |
| Solids, Total Dissolved (mg/l) | - | - | - | - | Mon/Mon | - | MA/DM | - | * | 500 | Tech OK | - | - | T | - |
| Oil & Grease (mg/l) | - | - | - | - | Mon/15 | - | MA/DM | - | * | Narrative 703.2 | Tech OK | - | - | T | - |

| **Outfall** | 022 (formerly known as 03A) [1] |
|---|---|

| | |
|---|---|
| Source(s) of Wastewater | Treated sanitary wastewater |
| Existing Wastewater Treatment Facilities | Two 10,000 gal. septic tanks followed by two 10-foot diameter Bioclere trickling filter units, sodium hypochlorite disinfection |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. (mg/l) | Conc. (mg/l) | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | NO | | - | - |
| Flow Rate, units = MGD | Average 0.005 | | Maximum 0.014 | | Mon/Mon | | MA/DM | NA | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum 6.2 | | Maximum 8.5 | | 6.0 –9.0 | | Range | | R – Secondary Treatment | 6.5 – 8.5 | 6.5-8.5 | - | RNG | WQ | - |
| $CBOD_5$ (mg/l) | - | - | - | - | 25 | 40 | MA/DM | - | R – Secondary Treatment | - | - | - | - | - | - |
| $BOD_5$ (mg/l) | - | - | - | - | - | - | - | - | - | ISEL[2] | 5.0 | - | DM | WQ | - |
| Dissolved Oxygen (mg/l) | - | - | - | - | 7.0/Mon | - | Daily Minimum/MA | - | New parameter required per ISEL[2]. | ISEL[2] | 7.0 | - | MIN | WQ | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | 30/45 | - | MA/DM | - | R – Secondary Treatment | ISEL[2] | 10 | - | DM | WQ | - |
| Solids, Settleable (ml/l) | - | - | - | - | Mon/0.3 | - | MA/DM | - | R – Secondary Treatment. | ISEL[2] | 0.1 | - | DM | WQ | - |
| Ammonia, NH3 (mg/l) summer<br>winter | - | - | - | - | - | - | - | - | - | ISEL[2] | 1.5<br>2.2 | - | DM | WQ | - |
| Coliform, Fecal (CFU) | 20/720 | 22/370 | - | - | 200/400 | - | 30-DayGM/<br>7-Day GM | - | R - WQ | 703.4 | 200/400 | - | - | WQ | - |
| Chlorine, Total Residual (ug/l) | 0.0/7.6 | - | - | - | M/2000 | - | MA/DM | 20 | R - BPJ | 5.0 | 5.0 | - | DM | WQ/DL | - |

1 - This is an *internal* outfall under existing operation, but will be converted to a direct discharge to intermittent Unnamed Tributary 1. Facility is allowed to meet current limits (as specified under this outfall's previous designation - Outfall 03A) until EDPM + 2 years (see Footnote 12 in modified permit).

2 - Intermittent stream effluent limits (ISEL) applied to Outfall 022.

| **Outfall** | 023 (formerly known as 03B) [1] |
|---|---|
| Source(s) of Wastewater | CKD Landfill Leachate |
| Existing Wastewater Treatment Facilities | None. |
| EPA Point Source Category & Production Rate | NA |

| **Effluent Parameter** (Units) (Concentration Units - mg/l, ug/l or ng/l; Mass Units - lbs/d or g/d) | **Existing Effluent Quality** | | | | **Technology Based Effluent Limit** | | | | | **Water Quality Based Effluent Limit** | | | | **Permit Basis** (T or WQ) | **WQ Notes** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Concentration | | Mass | | | | | PQL | | AWQC | Effluent | | | | |
| | Ave/Max | 95%/99% | Ave/Max | 95%/99% | Conc. | Mass | Type | Conc. | Basis | Conc. | Conc. | Mass | Type | | |
| WET TESTING | | | | | NA | | | | | Recommended? | | YES | | WQ | - |
| Flow Rate, units = MGD | Ave: 0.025 | | Max: 1.17 | | Mon/Mon | | DA/DM | - | R - BPJ | - | - | - | - | T | - |
| pH (su) | Minimum: No Data | | Maximum: No Data | | Monitor | | MA/DM | | R - BPJ | 6.5 – 8.5 | 6.5-8.5 | - | - | T | - |
| Solids, Total Suspended (mg/l) | - | - | - | - | Monitor | - | MA/DM | - | R - BPJ | ISEL[2] | 10 | - | DM | WQ | - |
| Solids, Total Dissolved (mg/l) | - | - | - | - | Monitor | - | MA/DM | - | R - BPJ | 500 | 500 | - | DM | WQ | - |
| Solids, Settleable (ml/l) | - | - | - | - | Monitor | - | MA/DM | - | R – BPJ[3] | - | - | - | - | - | - |
| Sulfates, Total (mg/l) | - | - | - | - | Monitor | - | MA/DM | - | R - BPJ | - | - | - | - | T | - |
| Aluminum, Total (mg/l) | - | - | - | - | 2.0/4.0 | - | MA/DM | - | TOGS 1.2.1, Att C | 100 Ionic | - | - | - | T | - |
| Arsenic, Total (ug/l) | - | - | - | - | Monitor | - | MA/DM | - | R - BPJ | 150 | 150 | - | DM | WQ | - |
| Mercury, Total (**ng/l**) | - | - | - | - | Mon/50 | - | MA/DM | - | R - WQ | 0.7 ng/l | 50 | - | DM | WQ/MDV | - |
| WET – Acute Invertebrate | - | - | - | - | - | - | - | - | - | None | 0.3 | | AL | WQ | - |
| WET - Acute Vertebrate | - | - | - | - | - | - | - | - | - | None | 0.3 | | AL | WQ | - |
| WET – Chronic Invertebrate | - | - | - | - | - | - | - | - | - | None | 1.0 | | AL | WQ | - |
| WET – Chronic Vertebrate | - | - | - | - | - | - | - | - | - | None | 1.0 | | AL | WQ | - |

1 - This is an *internal* outfall under existing operation, but will be converted to a direct discharge to intermittent Unnamed Tributary No. 1 following the RPM. Facility is allowed to meet current limits (as specified under previously-designated Outfall 03B) until Modernization operations commence (see Footnote 9 in modified permit).

2 - Intermittent stream effluent limits (ISEL) applied to Outfall 023.

3 – Settleable solids indicated by TSS WQBEL.

# (4) Additional Issues:

## Water Quality Based Effluent Limits (WQBELs):

New York State water quality regulations (for surface waters) are implemented by applying the Total Maximum Daily Load (TMDL) process to watersheds, drainage basins or waterbody segments on a pollutant specific basis. The analysis determines if there is a "reasonable potential" that the discharge of a pollutant will result in exceedance of ambient water quality criteria (AWQC). If there is a reasonable potential for an exceedance of AWQC, the TMDL is used to establish waste load allocations for point sources and load allocations for nonpoint sources of the pollutant. For point sources, the waste load allocations are translated to WQBELs for inclusion in SPDES permits. Reference - TOGS 1.3.1, USEPA Guidance for Water Quality - Based Decisions: The TMDL Process, 40 CFR 130 and the Clean Water Act 303(d).

## Statistics:

The statistical methods utilized are consistent with TOGS 1.2.1 and the USEPA, Office of Water, Technical Support Document For Water Quality-based Toxics Control, March 1991, Appendix E. They are generally based on lognormal analysis. If other data distributions such as normal or delta-lognormal are utilized it is noted below. Statistical calculations were not performed for parameters with insufficient data. Generally, ten or more data points are needed to calculate percentiles. Two or more data points are necessary to calculate an Average and a Maximum. Non-detects were included in the statistical calculations at the reported detection limit unless otherwise noted.

Monitoring data collected during the following time period was used to calculate statistics:

*Thermal data:* June 2006 - September 2008 - 9,341 data points
*Conventional pollutants:* May 2006 – July 2009

This data was taken from the following source(s):

*Thermal data:* Arithmetic means - Permittee Percentile ranks: DMRs (SPDES Information System or "SIS")
*Conventional pollutants:* SIS

## Internal Waste Stream Monitoring:

40 CFR 122.45(h)(1) allows the permit authority to monitor and limit parameters at internal locations when controlling them solely at the final outfall is impractical or infeasible. Dilution of a process wastewater with large volumes of cooling water and/or storm water is one example of when the use of an internal monitoring point is justified. Monitoring at the following internal outfalls is necessary for the reasons specified:

Outfall 03A, Re-Numbered Outfall 022 – To maintain sanitary effluent limits and compliance with applicable criteria, before commingling with and dilution from other waste streams.
Outfall 03B, Re-Numbered Outfall 023 – To monitor leachate quality and level of potential toxic contaminants, before commingling with and dilution from other waste streams.

During the plant modernization, the status of unnamed tributary 1 of Coeymans Creek will be restored and outfalls 022 and 023 will no longer be internal waste streams.

## WET Testing:

Testing is required, in accordance with TOGS 1.3.2, for the following reasons: Chronic testing recommended by *Toxicity Testing Unit* due to low stream/effluent dilution ratio and potential pollutants for Outfall 003 ($MA_7CD_{10}$ = 0.969 MGD, DA Effluent Q = 1.8 MGD) and Outfall 023 ($MA_7CD_{10}$ = 0 MGD).

## Indicator Parameters:

In accordance with 40 CFR 122.44(e)(2), The permit writer has determined that effective treatment and/or acceptable performance for specific parameters is indicated by one or more other parameters which are limited and therefore a decision has been made to not limit or monitor these specific parameters. This judgement is based on the similarity between this and the regulated parameter(s) and historical data where available. The use of indicator parameters is not appropriate for WQBELs. Following is a list of the affected parameters: None.

## Schedules of Compliance:

*Biological Studies:* Additional requirements related to biological studies have been added to the permit to consider requirements under the RPM.

*Special Monitoring – Ground Water:* As specified during the August 30, 2010 permit modification, the permittee must complete special Monthly monitoring for Priority Pollutant Metals, for 3 consecutive months, for ground water that is used for quench, before commingling with other wastestreams or cooling water which are discharged from Outfall 003. For Total Mercury analysis, EPA Method 1631 shall be used.

*Special Monitoring – Landfill Leachate:* As specified during the August 30, 2010 permit modification, the permittee must complete special Monthly monitoring for Priority Pollutant Metals, and other parameters, for 3 consecutive months, at newly designated internal Outfall 03B.

*Storm Water Best Management Practices (BMPs)*: As specified during the August 30, 2010 permit modification, the permittee must complete all storm water BMP work which was itemized in a letter from facility Environmental Manager John Reagan to Andrea Dzierwa of the Department's Region 4 Office, dated May 30, 2008, within 8 months of the EDPM.

### Pollutant Minimization Program

A Mercury Minimization Program (MMP) was added to the permit during the previous modification, dated August 30, 2010, since the WQBEL of 0.7 ng/L is lower than the permit limit of 50 ng/L. The goal of the PMP is to meet the calculated WQBEL to reduce Mercury effluent levels pursuant of the calculated WQBEL. Periodic monitoring; an acceptable control strategy which will become enforceable under the permit; and the submission of annual reports shall be required under the PMP. The PMP may be subject to modification as needed.

## (5) Summary of Proposed Permit Changes:

Compared to the issued permit this draft is intended to replace, the following significant changes are proposed -

**Outfall 003 -** This outfall will be deleted from the permit upon Expiration Date of Permit (ExDP) or commencement of Modernization operations, whichever occurs first. This conforms to the Phase 1 project schedule . Footnote No. 9 has been added to the permit to indicate this.

**Outfall 03C -** This outfall will be deleted from the permit upon Expiration Date of Permit (ExDP) or commencement of Modernization operations, whichever occurs first. Footnote No. 9 has been added to the permit to indicate this.

**Outfall 006 -** This outfall will be deleted from the permit upon Expiration Date of Permit (ExDP) or commencement of Modernization operations, whichever occurs first. Footnote No. 9 has been added to the permit to indicate this.

**Outfall 020 -** This is a new outfall is added to the permit for the discharge of quarry water, following commencement of discharges under modernization operations (see Footnote No. 10 of permit).

**Outfalls 021, 024 & 025 -** These new outfalls are added to the permit for the discharge of storm water from the cement manufacturing area (see Footnote No. 11 of permit).

### Outfall 022 (formerly known as 03A)

*pH* – The limit range for this parameter has been changed from 6.0 – 9.0 to 6.5 – 8.5, to meet Intermittent Stream Effluent Limits (ISELs).
*$CBOD_5$* – This parameter has been deleted from the permit because it is replaced with $BOD_5$ monitoring and limit.
*$BOD_5$* – This parameter has been added with a limit of 5.0 mg/l to reflect Intermittent Stream Effluent Limits (ISELs).
*Solids, Total Suspended* – A new limit of 10 mg/l has been added to reflect ISEL requirements.
*Solids, Settleable* – A new limit of 0.1 ml/l has been added to reflect ISEL requirements.
*Ammonia, as $NH_3$* – The parameter with seasonal limits of Monitor for MA, 1.5 mg/l DM- June – October, and 2.2 DM – November – May, have been added to the permit because the discharge will be to Unnamed Tributary No. 1 to Coeymans Creek, and ISEL limits must be met.
*Chlorine, Total Residual,* – "Monitor" requirement for MA is maintained and a new WQBEL DM of 5 would be applied but is superseded by PQL of 20 ug/l.

### Outfall 023 (formerly known as 03B)

*Solids, Total Suspended* – The limit for DM has been changed to 10 mg/l to reflect ISEL requirements.
*Solids, Settleable* - Monitoring for this parameter has been deleted from the permit.
*Solids, Total Dissolved* - The limit for DM has been changed to 500 mg/l to reflect ISEL requirements.
*Aluminum, Total* – Monitor requirements for MA and DM have been changed to limits of 2000 ug/l and 4000 ug/l, respectively, based on BPJ.
*Arsenic, Total* – Monitor requirements for DM have been changed to a limit of 150 ug/l based on WQ.
*WET Testing* – Action Levels applicable to intermittent streams have been included.

**Biological Fact Sheet - Cooling Water Intake Structure**
**Bureau of Habitat, Steam Electric Unit**

**Name of Facility**: LaFarge Ravena Facility
**Owner/Operator**: LaFarge North America
**SPDES #**: NY-0005037
**Location**: Ravena, New York
Hudson River

## Description of Current Facility

Lafarge North America Inc. (Lafarge) operates a cement manufacturing facility on the West shore of the Hudson River in the village of Ravena. The Lafarge facility currently uses a once-through cooling system, withdrawing water from the Hudson for cooling purposes and in the cement manufacturing process. The cooling water intake structure (CWIS) is located approximately 150' from the shoreline. The CWIS is a benthic "T" shaped structure, and is positioned about three feet from the water's surface at mean low water. Each end of the "T" has an opening covered with 3/4" screen. Two pumps rated at 3,000 GPM each can withdraw a maximum of 8.6 MGD of cooling water, however, the average water withdrawal is about 2.4 MGD. The cooling water flows from the "T" structure through one 3/8" mesh traveling screen. Fish and other debris impinged upon the traveling screen are washed into a collection tray and then deposited in an on-site disposal area. The cooling water is pumped to a spherical reservoir located on top of one of the facility buildings. Other water sources, such as quarry water, storm water and recycled plant water supplement the cooling water stored in the reservoir. After being used in facility processes, the water is sent back through a series of settling ponds where it is chlorinated and adjusted for pH, and finally discharged into Coeyman's creek. The delta T for the cooling water is $16^{o}$ F.

## Description of Proposed Modernized Facility

Lafarge has prepared a draft EIS and SPDES permit modification package for the proposed modernization of its facility, moving from a "wet-process" to a "dry-process" for manufacturing cement. Additionally, Lafarge also plans to construct a heat-recovery cogeneration facility to produce 6 MWh of electricity for plant use. The modernized facility will primarily depend on quarry and well water for its cooling and process water needs, but will continue to use the existing intake structure to withdraw up to 2 MGD of Hudson River water in the event that quarry and well water volume is insufficient. The reduction in river water usage compared to the current facility will be realized through the use of a closed-cycle cooling system and an increase in quarry and well water supply. The new facility will also recycle its cooling tower blowdown, so there will no longer be a thermal discharge to Coeyman's Creek.

## Ecological Resource

The Hudson River in the vicinity of the intake structure is tidal, and fresh water in nature. The Hudson River near Albany is classified as a Class C water body. The best usage of Class C waters

includes fishing, and such waters shall support fish propagation and survival. The water quality shall also be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. Coeyman's Creek is classified as a class CT waterbody.

Specific aquatic population studies have not been performed at the Lafarge facility. However, ongoing fisheries studies in the Hudson River in the vicinity of the Lafarge CWIS indicate that fish species expected in the area include (but are not limited to): shortnose sturgeon, Atlantic sturgeon, striped bass, white perch, American shad, alewife, blueback herring, American eel, gizzard shad, spottail shiner, largemouth bass, smallmouth bass, white catfish, tessellated darter and yellow perch. Eggs, larvae and juvenile shortnose and Atlantic sturgeon are found in the Hudson River near the CWIS (Bain 2007). Blue crab can also be found in this location in the summer.

Lafarge used data from the 2002 Year Class Report (ASA 2004)to estimate the number of organisms potentially entrained by the CWIS. Based upon actual water usage data for the current facility, Lafarge estimated approximately 870,800 organisms are entrained annually. Using the calculation baseline, Lafarge estimated approximately 4.5 million organisms could be entrained annually. Baseline entrainment estimate for the new facility would be about 866,110 organisms. No impingement data exists at this time for this facility.

**Alternatives to Minimize Impingement Mortality and Entrainment at the Modernized Facility**

Because the new facility will not have a thermal discharge, the facility will no longer be required to meet the BTA standard of 6 NYCRR Part 704.5. However, under "Goal 1" of the *Hudson River Estuary Action Agenda (2010 – 2014)*, all industries using cooling system intake structures are expected to reduce impingement mortality and entrainment.

As part of the Environmental Impact Statement, Lafarge evaluated the following feasible technologies to minimize adverse environmental impact:

- Closed Cycle Cooling
- Flow Reduction
- Wedgewire screens
- Barrier nets
- Aquatic filter barrier
- Ristroph traveling screen
- Fine-mesh traveling screen
- Variable Speed Pumps
- Alternative cooling water sources

After evaluating all of the available alternatives, the Department has determined that the following combination of technologies and operational measures minimize adverse environmental impacts from the cooling water intake structure, consistent with Goal #1 of the *Hudson River Estuary Action Agenda* for 2010-2014.

- The new facility will use quarry water and well water as alternative sources to Hudson River water for industrial purposes;
- Hudson River water will ONLY be used when the other two sources of water are not adequate;

- Reduce the capacity of the CWIS to 2 MGD;
- Operate a wet closed-cycle cooling on the cogeneration plant and a glycol closed-cycle cooling system for the dry kiln manufacturing process;
- Install wedgewire screens with a slot-width of 0.5 mm on the Hudson River intake.

The Department has required Lafarge to perform a study to determine the feasibility of operating the new facility with 0.5 mm slot-width wedgewire screens. Though the manufacturer of the screens has indicated these screens should be feasible, in-river testing is needed to verify the engineering results.

## Legal Requirements

The requirements for the cooling water intake structure in this State Pollutant Discharge Elimination System permit are consistent with the policies and requirements embodied in the New York State Environmental Conservation Law, in particular - Sec.1-0101.1.; 1-0101.2.; 1-0101.3.b., c.; 1-0303.19.; 3-0301.1.b., c., i., s. and t.; 11-0107.1; 11-0303.; 11-0535.2; 11-1301.; 11-1321.1.; 17-0105.17.; 17-0303.2., 4.g.; 17-0701.2. and the rules thereunder.

## References

2002 Year Class Report for the Hudson River Estuary Monitoring Program. ASA Analysis and Communications, Inc., October 2004.

Bain, M. B. (1997). "Atlantic and shortnose sturgeons of the Hudson River: common and divergent life history attributes." Environmental Biology of Fishes(48): 347-358.

Classification of New York State water bodies 6NYCRR Part 863 www.dec.ny.gov

Lafarge response to the RFI, prepared by HDR, Pearl River, NY, submitted October 3, 2008.

Draft Environmental Impact Statement. Prepared by HDR, Pearl River, NY, submitted August 2010.

Document prepared by C. Kimble and last revised on September 8, 2010.

## (6) Explanatory Notes:

Please note that some of these terms are not applicable to every Fact Sheet.

AL - Action level calculated in accordance with TOGS 1.2.1 (non POTWs) and TOGS 1.3.3 (POTWs). See the permit for a complete definition.
AVG or Av - Average. The arithmetic mean.
AWQC - Ambient water quality criteria for the receiving water. The applicable standard, guidance value or estimated value in accordance with TOGS 1.1.1, TOGS 1.3.1 and 6NYCRR 700-705.
Basis - The technical analysis, internal guidance, regulation and/or law upon which an effluent limit or monitoring requirement is proposed.
BAT - Best Available Technology Economically Achievable in accordance with TOGS 1.2.1 (non POTWs) and TOGS 1.3.3 (POTWs), 40 CFR 125, 6NYCRR 750, ECL 17-0811 and the Clean Water Act.
BCT - Best Conventional Control Technology in accordance with TOGS 1.3.4, 40 CFR 125, 6NYCRR 750, ECL 17-0811 and the Clean Water Act.
BPJ - Best Professional Judgement in accordance with TOGS 1.2.1 (non POTWs) and TOGS 1.3.3 (POTWs), 40 CFR 122 and 125, 6NYCRR 750, ECL 17-0811 and the Clean Water Act.
BPT - Best Practicable Control Technology in accordance with TOGS 1.2.1, 40 CFR 125, 6NYCRR 750, ECL 17-0811 and the Clean Water Act.
Conc. - Concentration in units of mg/l, ug/l or ng/l.
D - Daily.
Design Flow - Treatment system design capacity as noted in an approved engineering report.
Final - Final permit requirements. A level of performance that must be achieved according to a schedule specified in either the permit or a consent order.
g/d - Grams per day.
GM - Geometric mean.
GW - Groundwater effluent limitation developed in accordance with TOGS 1.2.1 (non-POTWs), TOGS 1.3.3 (POTWs), TOGS 1.1.2 and 6NYCRR 703.
Ind - Indicated parameter. See definition in section (4).
Int - Intermittent
Interim - Interim permit period requirements. A level of performance that must be achieved while improvements are being implemented in order to achieve final permit period requirements.
lbs/d or #/d - Pounds per day.
Mass - Mass discharge in units of #/d or g/d discharge.
Max or Mx - The maximum value.
MGD - Million gallons per day.
mg/l - Milligrams per liter.
Dilution/Mixing - Used to determine dilution available in receiving waters. For lakes, estuaries and slowly flowing rivers and streams, mixing zone dilution is generally assumed to be 10:1 unless data is available to indicate otherwise.
Model - Calibrated water quality model applied in accordance with TOGS 1.3.1.
Mon - Monitor only.
NA - The characteristics of this parameter and the reported discharge levels do not justify routine monitoring or a limit. Also indicates "not applicable".
ND - Non-Detect.
ng/l - Nanograms per liter. 1000 ng/l = 1 ug/l = 0.001 mg/l.
PQL - The DEC published or site specific practical quantitation limit; the concentration in wastewater at which analytical results are thought to be accurate to within approximately plus or minus thirty percent.
R - "Rolled Over", i.e. the specific requirement in this permit is equivalent to the previous permit. R(T) is roll over of a technology based requirement and R(WQ) is roll over of a WQBEL.
Range - The discharge is limited to a range of effluent values, e.g. a pH limit of (6.0-9.0) SU.
RREL - EPA's Risk Reduction Engineering Laboratory treatability database.
T - Technology based effluent limit or requirement.
TOGS - Technical and Operational Guidance Series. Internal guidance to permit drafters used by the NYSDEC Division of Water to aid in permit drafting. Copies of these guidance documents may be obtained from the internet at http://www.dec.state.ny.us/website/dow/togs/index.htm.
ug/l - Micrograms per liter. 1000 ug/l = 1 mg/l.
WET- Whole Effluent Toxicity (testing). See TOGS 1.3.2.
WQ - Water quality.
WQBEL - Water quality-based effluent limit. See information in section (4).
7Q10 - Minimum average 7 consecutive day flow at a recurrence interval of 10 years. Applicable to evaluations involving aquatic health based AWQC.
30Q10 - Minimum average 30 consecutive day flow at a recurrence interval of 10 years. Applicable to evaluations involving human health based AWQC.
95% - The 95th percent confidence interval for the historical effluent data used to draft the permit.
99% - The 99th percent confidence interval for the historical effluent data used to draft the permit.
133 - Secondary treatment requirements in accordance with TOGS 1.3.3, 40 CFR 133, 6NYCRR 750, ECL 17-0509 and the Clean Water Act.
$^{+}$ - These parameters represent scans. Detections vary among the compounds which are included in the scans. The listed value represent the maximum detected level of any compound in the scan.